



International  
Injury Research Unit

# Bloomberg Philanthropies Initiative for Global Road Safety (BIGRS) 2020–2025 Roadside Observational Study

Technical Appendix for Dhaka North Round One

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The Johns Hopkins International Injury Research Unit partnered with the Centre for Injury Prevention and Research, Bangladesh to conduct roadside observations in Round 1, (Aug – Oct 2021). The methods for these findings were developed by the Johns Hopkins International Injury Research Unit and implemented in collaboration with the Centre for Injury Prevention and Research, Bangladesh. This report provides results from observational surveys that represent population-level (citywide) prevalence of important road safety risk factors (speed, helmet use, seat-belt and child restraint use) in Round 1. For speed, there were approximately 54,975 observations; for helmet use, 48,505 observations; and for seat-belt and child restraint use 39,794 observations

Observation sites were selected to obtain a representative sample of vehicles and road users in each city, conditional on the safety of observers. There were 15 observation sites per risk factor, and a standardized protocol was used with vehicles selected for observation in a systematic quasi-random fixed sequence. Observations were performed between 7:30 a.m. and 7 p.m. on both weekend days and weekdays. The methods were designed to estimate citywide prevalence and cannot provide insights into interventions conducted in specific locations in the city.

This technical appendix was created on 2022-04-11 by the Johns Hopkins International Injury Research Unit using the following files:

- BIGRS3\_GAR tech appendix\_220411.do
- R1\_Dhaka North\_BIGRS3 speed\_220421fixed.dta
- R1\_Dhaka North\_BIGRS3 helmet\_220406fixed.dta
- R1\_Dhaka North\_BIGRS3 seatbelt\_220407fixed.dta

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## 1. Speeding

### Key findings

- Overall, 13% of vehicles were traveling over the posted speed limit.
- Speeding was highest among pickup/light trucks (41%).
- One out of 4 commercial vehicle was traveling above the posted speed limit.
- Nearly, 55% of vehicles on collector/local roads were traveling above the safe speed (30 km/h).

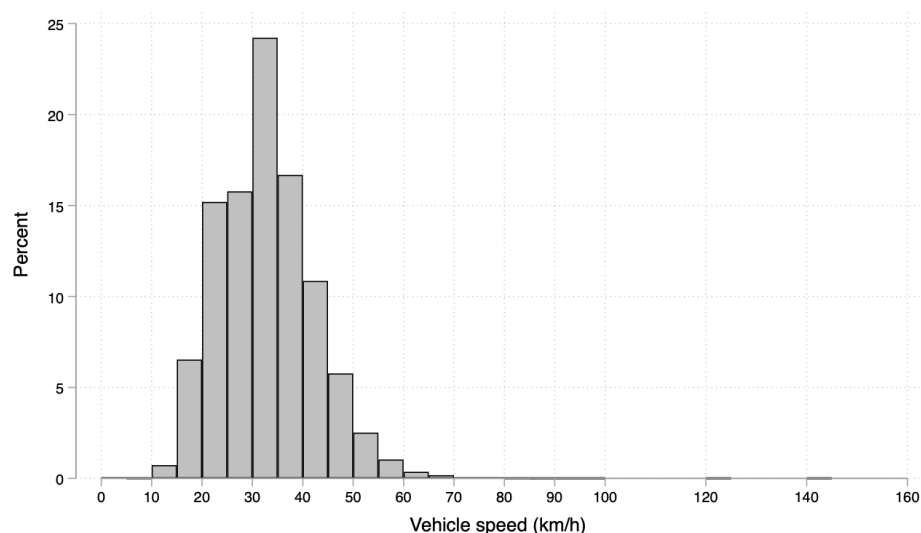
### 1.1. Total number of observed vehicles

54975

### 1.2. Prevalence of speeding and mean, median, and 85th percentile speed among all vehicles

N	Prevalence (%)	Mean (km/h)	Median (km/h)	85th pctl (km/h)
53550	12.8	32.2	32	42

### 1.3. Histogram of speed among all vehicles



### 1.4. Prevalence of speeding and mean, median, and 85th percentile speed by vehicle type (motorcycles, light vehicles, heavy vehicles)

Vehicle type	n	Prevalence (%)	Mean (km/h)	Median (km/h)	85th pctl (km/h)
Motorcycle	16854	9.5	33.9	34	45
Light vehicles*	31100	17.0	31.7	32	41

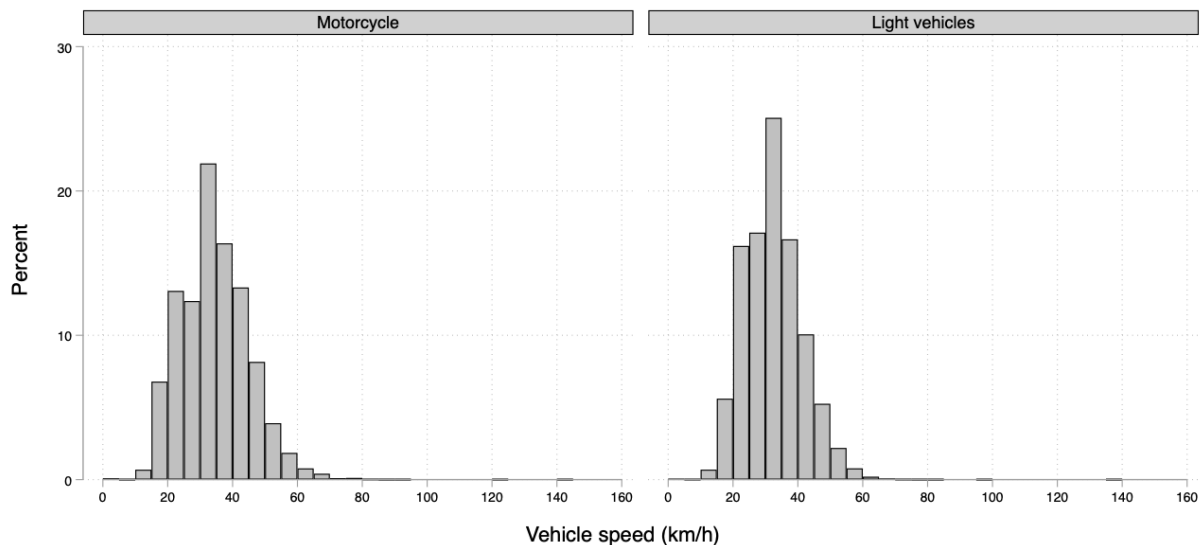
#### Heavy vehicles†

\* Light vehicles include sedan/saloon/SUV/4WD, minibus/minivan, and pickup/light truck.

† Heavy vehicles include bus and truck/large truck.

Vehicle type	n	Prevalence (%)	Mean (km/h)	Median (km/h)	85th pctl (km/h)
Pickup/Light truck	3688	41.4	30.6	30	39
Minibus/Minivan	8859	23.7	30.6	31	38
Sedan/Saloon/SUV/4WD	19978	10.4	32.5	32	42
Motorcycle	16854	9.5	33.9	34	45
Other	5596	0.0	29.5	30	38

### 1.5. Histogram of speed by vehicle type



Graphs by Vehicle type (3 categories)

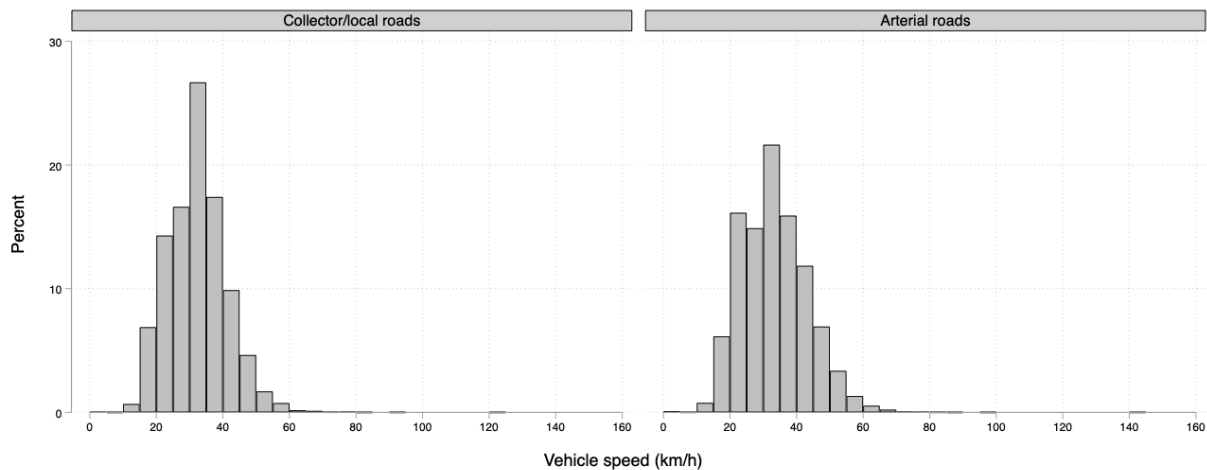
### 1.6. Prevalence of speeding and mean, median, and 85th percentile speed by road type (collector/local, arterial)

Road type	n	Prevalence (%)	Mean (km/h)	Median (km/h)	85th pctl (km/h)
Collector/local	26662	15.2	31.7	32	41
Arterial	26888	10.6	32.7	32	43

### 1.7. Prevalence of speeding over 30 km/h in collector/local roads & 50 km/h in arterial roads

	n	Prevalence (%)
> 30 km/h in collector/local	26888	54.7
> 50 km/h in arterial	28087	4.8

### 1.8. Histogram of speed by road type



Graphs by Road type

### 1.9. Prevalence of speeding, speeding by more than 10 or 20 km/h above the limit, and mean, median, and 85th percentile speed by speed limit

Speed limit (km/h)	n	Prevalence of speed > limit (%)	Prevalence of speed > limit + 10 (%)	Prevalence of speed > limit + 20 (%)	Mean (km/h)	Median (km/h)	85th pctl (km/h)
30	6465	54.4	0.1	0.0	31.3	32	39
40	14313	18.5	0.0	0.0	30.8	30	40
50	15546	3.6	0.0	0.0	32.8	32	42
60	11630	1.4	0.0	0.0	34.8	34	46
999	0	.	0.0	0.0	32.7	32	41

#### 1.10. Prevalence of speeding and mean, median, and 85th percentile speed by vehicle ownership

Vehicle ownership type	n	Prevalence (%)	Mean (km/h)	Median (km/h)	85th pctl (km/h)
Commercial	12333	24.6	31.3	32	39
Taxi	55	9.1	32.3	32	46
Ride-share	245	9.0	33.2	32	45
Other (incl private and govt)	40917	9.3	32.5	32	43

#### 1.11. Prevalence of speeding and mean, median, and 85th percentile speed by day of the week

Day of the week	n	Prevalence (%)	Mean (km/h)	Median (km/h)	85th pctl (km/h)
Monday	7969	14.8	31.7	31	43
Tuesday	1517	22.3	33.9	34	46
Wednesday	6309	9.4	32.5	32	42
Thursday	8982	11.9	32.0	32	41
Friday	8378	15.5	33.1	32	42
Saturday	11191	9.1	31.4	31	40
Sunday	9204	15.1	32.4	32	42

#### 1.12. Prevalence of speeding and mean, median, and 85th percentile speed by observation session start time

Session start time	n	Prevalence (%)	Mean (km/h)	Median (km/h)	85th pctl (km/h)
6:30-9:00	9775	13.5	32.3	32	41
9:01-11:00	10751	11.6	32.2	32	42
11:01-14:00	10423	13.3	32.0	32	42
14:01-16:00	11454	13.3	32.2	32	42
16:01-19:00	11147	12.5	32.2	32	42



The following analyses on speeding are restricted to vehicles in free flow speed, which are defined as those traveling faster than the speed limit when/where there is no impedance for drivers to speed freely, such as bad weather, a junction, tight bend, speed bump, stop sign, crosswalk, and law enforcement activities nearby.

#### 1.13. Mean, median, and 85th percentile among vehicles in free flow speed

n	Mean (km/h)	Median (km/h)	85th pctl (km/h)
3319	42.0	41	51

#### 1.14. Mean, median, and 85th percentile among vehicles in free flow speed by vehicle type

Vehicle type	n	Mean (km/h)	Median (km/h)	85th pctl (km/h)
Motorcycle	811	47.9	45	62
Light vehicles*	2508	40.1	39	47
Heavy vehicles†	.	.	.	.

\* Light vehicles include sedan/saloon/SUV/4WD, minibus/minivan, and pickup/light truck.

† Heavy vehicles include bus and truck/large truck.

#### 1.15. Mean, median, and 85th percentile among vehicles in free flow speed by road type

Road type	n	Mean (km/h)	Median (km/h)	85th pctl (km/h)
Collector/local	980	40.1	38	47
Arterial	1965	43.3	42	51

#### 1.16. Mean, median, and 85th percentile among vehicles in free flow speed by speed limit

Speed limit (km/h)	n	Mean (km/h)	Median (km/h)	85th pctl (km/h)
30	1609	37.2	36	42
40	1068	46.1	45	51
50	146	54.3	53	57
60	122	68.5	66	75

#### 1.17. Mean, median, and 85th percentile among vehicles in free flow speed by vehicle ownership

Vehicle ownership type	n	Mean (km/h)	Median (km/h)	85th pctl (km/h)
Commercial	1314	38.4	37	44
Taxi	3	49.0	46	55
Ride-share	15	48.4	42	67
Other (incl private and govt)	1613	45.5	44	54

#### 1.18. Mean, median, and 85th percentile among vehicles in free flow speed by day of the week

Day of the week	n	Mean (km/h)	Median (km/h)	85th pctl (km/h)
Monday	538	43.2	41	52
Tuesday	208	37.9	37	52
Wednesday	55	38.3	38	44
Thursday	119	39.5	39	44
Friday	162	41.0	39	45
Saturday	702	41.3	40	52
Sunday	1161	44.1	43	49

#### 1.19. Mean, median, and 85th percentile among vehicles in free flow speed by observation session start time

Session start time	n	Mean (km/h)	Median (km/h)	85th pctl (km/h)
6:30-9:00	680	42.1	41	50
9:01-11:00	620	41.5	41	49
11:01-14:00	632	42.8	42	51
14:01-16:00	700	42.3	41	49
16:01-19:00	687	41.3	41	51

## 2. Helmet use

### Key findings

- Overall, any helmet use was 92%. However, correct helmet use among all occupants was 78%.
- Correct helmet use was higher among drivers (87%) as compared to passengers (47%).
- Children (under 18 years of age) were less likely to use a helmet (54%) as compared to adults (87%).
- Correct helmet use was lower among female occupants and occupants of commercial two-wheeler vehicles.
- Correct helmet use was also lower among on Fridays (weekend) and on local roads.

### 2.1. Total number of observed vehicles, drivers, and passengers

Vehicles: 48505

Drivers: 48505

Passengers: 13479

In the following analyses on helmet use, any helmet use is defined as strapped or unstrapped use of helmet of any type, and correct helmet use is defined as strapped use of full-face or non-full-face helmet (but not cap helmet). Any helmet use is unobservable when helmet use is unobservable, and correct helmet use is unobservable when helmet use, strap use, or helmet type is unobservable.

### 2.2. Prevalence of any helmet use and correct use among all occupants

#### Any helmet use

n	Any use (%)	No use (%)	Unobservable (%)
61984	92.2	7.8	0.0

#### Correct helmet use

n	Correct use (%)	Incorrect use (%)	No use (%)	Unobservable (%)
61984	78.3	13.7	7.8	0.2

### 2.3. Prevalence of any use and correct use among drivers by age

#### Any helmet use

Age (y/o)	n	Any use (%)	No use (%)	Unobservable (%)
<18	109	63.3	36.7	0.0
>=18	48080	94.9	5.1	0.0
Unobservable	316	91.8	8.2	0.0
Overall	48505	94.8	5.2	0.0

#### Correct helmet use

Age (y/o)	n	Correct use (%)	Incorrect use (%)	No use (%)	Unobservable (%)
<18	109	54.1	9.2	36.7	0.0
>=18	48080	87.1	7.6	5.1	0.3
Unobservable	316	82.9	8.9	8.2	0.0
Overall	48505	87.0	7.6	5.2	0.3

### 2.4. Prevalence of any use and correct use among passengers by age

#### Any helmet use

Age (y/o)	n	Any use (%)	No use (%)	Unobservable (%)
<5	75	6.7	93.3	0.0
5-11	258	14.0	86.0	0.0
12-17	681	63.4	36.6	0.0
>=18	12395	85.6	14.4	0.0
Unobservable	70	75.7	24.3	0.0
Overall	13479	82.6	17.4	0.0

#### Correct helmet use

Age (y/o)	n	Correct use (%)	Incorrect use (%)	No use (%)	Unobservable (%)
<5	75	4.0	2.7	93.3	0.0
5-11	258	7.4	6.6	86.0	0.0
12-17	681	39.4	23.9	36.6	0.1
>=18	12395	48.4	37.0	14.4	0.1
Unobservable	70	42.9	31.4	24.3	1.4
Overall	13479	46.9	35.6	17.4	0.1

## 2.5. Prevalence of any use and correct use among drivers by sex

### Any helmet use

Sex	n	Any use (%)	No use (%)	Unobservable (%)
Female	304	91.8	8.2	0.0
Male	47737	94.8	5.2	0.0
Unobservable	464	94.4	5.6	0.0

### Correct helmet use

Sex	n	Correct use (%)	Incorrect use (%)	No use (%)	Unobservable (%)
Female	304	75.0	16.8	8.2	0.0
Male	47737	87.1	7.5	5.2	0.3
Unobservable	464	82.5	11.4	5.6	0.4

## 2.6. Prevalence of any use and correct use among passengers by sex

### Any helmet use

Sex	n	Any use (%)	No use (%)	Unobservable (%)
Female	2487	69.7	30.3	0.0
Male	10920	85.8	14.2	0.0
Unobservable	72	40.3	59.7	0.0

### Correct helmet use

Sex	n	Correct use (%)	Incorrect use (%)	No use (%)	Unobservable (%)
Female	2487	31.8	37.8	30.3	0.2
Male	10920	50.5	35.2	14.2	0.1
Unobservable	72	22.2	18.1	59.7	0.0

## 2.7. Prevalence of any use and correct use by road type

### Any helmet use

Road type	n	Any use (%)	No use (%)	Unobservable (%)
Collector/local	30028	87.3	12.7	0.0
Arterial	31956	96.8	3.2	0.0

### Correct helmet use

Road type	n	Correct use (%)	Incorrect use (%)	No use (%)	Unobservable (%)
Collector/local	30028	72.1	15.1	12.7	0.1
Arterial	31956	84.1	12.3	3.2	0.3

## 2.8. Prevalence of any use and correct use by vehicle ownership

### Any helmet use

Vehicle ownership type	n	Any use (%)	No use (%)	Unobservable (%)
Commercial	294	93.2	6.8	0.0
Taxi	23	95.7	4.3	0.0
Ride-share	900	94.8	5.2	0.0
Other (incl private and govt)	60767	92.1	7.9	0.0

### Correct helmet use

Vehicle ownership type	n	Correct use (%)	Incorrect use (%)	No use (%)	Unobservable (%)
Commercial	294	70.4	22.1	6.8	0.7
Taxi	23	82.6	4.3	4.3	8.7
Ride-share	900	72.2	22.6	5.2	0.0
Other (incl private and govt)	60767	78.4	13.5	7.9	0.2

## 2.9. Prevalence of any use and correct use by day of the week

### Any helmet use

Day of the week	n	Any use (%)	No use (%)	Unobservable (%)
Monday	6993	96.1	3.9	0.0
Tuesday	10072	91.8	8.2	0.0
Wednesday	8996	93.4	6.6	0.0
Thursday	8885	90.2	9.8	0.0
Friday	10538	87.6	12.4	0.0
Saturday	10014	92.7	7.3	0.0
Sunday	6486	96.0	4.0	0.0

### Correct helmet use

Day of the week	n	Correct use (%)	Incorrect use (%)	No use (%)	Unobservable (%)
Monday	6993	82.1	14.0	3.9	0.0
Tuesday	10072	78.3	13.5	8.2	0.1
Wednesday	8996	78.5	14.4	6.6	0.5
Thursday	8885	77.3	12.8	9.8	0.0
Friday	10538	73.0	14.0	12.4	0.6
Saturday	10014	77.6	14.9	7.3	0.2
Sunday	6486	84.5	11.4	4.0	0.0

## 2.10. Prevalence of any use and correct use by observation session start time

### Any helmet use

Session start time	n	Any use (%)	No use (%)	Unobservable (%)
6:30-9:00	9980	94.0	6.0	0.0
9:01-11:00	12149	92.5	7.5	0.0
11:01-14:00	12554	92.5	7.5	0.0
14:01-16:00	12765	91.2	8.8	0.0
16:01-19:00	14339	91.2	8.8	0.0

### Correct helmet use

Session start time	n	Correct use (%)	Incorrect use (%)	No use (%)	Unobservable (%)
6:30-9:00	9980	80.4	13.6	6.0	0.0
9:01-11:00	12149	77.7	14.7	7.5	0.0
11:01-14:00	12554	78.4	14.1	7.5	0.0
14:01-16:00	12765	77.4	13.8	8.8	0.0
16:01-19:00	14339	77.9	12.4	8.8	0.8



### 3. Seatbelt and child restraint use

#### Findings

- Seat-belt use was low among all occupants (43%).
- About 57% of all drivers and 5% of passengers were using a seat-belt.
- None of the children below 12 years of age were using any child restraint system.
- Seat-belt use was also lower among occupants of heavy vehicles (6%) as compared to occupants of light vehicles (54%).
- When disaggregated by vehicle ownership, seat-belt use was lowest among occupants of commercial vehicles at 15%.

#### 3.1. Total number of observed vehicles, drivers, and passengers

Vehicles: 39794

Drivers: 39794

Passengers: 14882

#### 3.2. Prevalence among all occupants

n	Yes (%)	No (%)	Unobservable (%)
54676	42.9	56.7	0.4

#### 3.3. Prevalence among drivers by age

Age (y/o)	n	Yes (%)	No (%)	Unobservable (%)
<18	22	40.9	59.1	0.0
18-24	1427	67.7	32.2	0.1
25-59	38081	56.9	42.9	0.2
>=60	238	48.3	51.7	0.0
Unobservable	26	0.0	80.8	19.2
Overall	39794	57.2	42.6	0.2

#### 3.4. Prevalence among passengers by age

Age (y/o)	n	Yes (%)	No (%)	Unobservable (%)
<5*	21	0.0	85.7	14.3
5-11*	178	0.0	92.7	7.3
12-17	777	3.6	94.1	2.3
18-24	4041	4.7	94.5	0.8

25-59	9521	5.1	94.3	0.6
>=60	344	4.7	91.3	4.1
Overall	14882	4.8	94.3	0.9

\* Child restraint use was measured for children under 12 y/o.

### 3.5. Prevalence among drivers by sex

Sex	n	Yes (%)	No (%)	Unobservable (%)
Female	190	69.5	30.0	0.5
Male	39327	57.3	42.5	0.2
Unobservable	277	36.8	62.5	0.7

### 3.6. Prevalence among passengers by sex

Sex	n	Yes (%)	No (%)	Unobservable (%)
Female	3142	3.4	95.2	1.4
Male	11699	5.2	94.1	0.7
Unobservable	41	0.0	73.2	26.8

### 3.7. Prevalence among passengers by front/rear seat

	n	Yes (%)	No (%)	Unobservable (%)
Front	6125	7.9	91.3	0.8
Back	8757	2.6	96.3	1.0

### 3.8. Prevalence by vehicle type

Vehicle type	n	Yes (%)	No (%)	Unobservable (%)
Light vehicles*	42435	53.6	45.9	0.5
Heavy vehicles†	12172	5.6	94.4	0.1

\* Light vehicles include sedan/saloon/SUV/4WD, minibus/minivan, and pickup/light truck.

† Heavy vehicles include bus and truck/large truck.

### 3.9. Prevalence by road type

Road type	n	Yes (%)	No (%)	Unobservable (%)
Collector/local	29758	43.4	56.2	0.3
Arterial	24918	42.3	57.2	0.5

### 3.10. Prevalence by vehicle ownership

Vehicle ownership type	n	Yes (%)	No (%)	Unobservable (%)
Commercial	19748	15.2	84.5	0.3
Taxi	164	52.4	47.6	0.0
Ride-share	387	32.3	67.7	0.0
Other (incl private and govt)	34377	58.9	40.6	0.5

### 3.11. Prevalence by day of the week

Day of the week	n	Yes (%)	No (%)	Unobservable (%)
Monday	6736	47.0	52.4	0.7
Tuesday	8574	55.6	44.1	0.2
Wednesday	6546	30.0	69.3	0.6
Thursday	8049	44.3	55.6	0.0
Friday	7814	35.6	64.1	0.3
Saturday	9274	44.6	54.7	0.7
Sunday	7683	40.1	59.6	0.3

### 3.12. Prevalence by observation session start time

Session start time	n	Yes (%)	No (%)	Unobservable (%)
6:30-9:00	10537	42.9	56.8	0.3
9:01-11:00	11365	40.7	59.0	0.2
11:01-14:00	10732	43.3	56.4	0.3
14:01-16:00	11017	42.7	57.0	0.3
16:01-19:00	11025	45.0	54.1	0.9